STATE OF COLORADO

John W. Hickenlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

January 29, 2014

Sabrina Forrest
Site Assessment Manager
U.S. Environmental Protection Agency
1595 Wynkoop Street, 8EPR-B
Denver, CO 80202-1129

Subject: Letter Report: London Mine (EPA ID# CO0000286203), Park County, Colorado

Dear Sabrina,

The London Mine has been the subject of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site Assessment activities and is currently under Notice of Violations / Cease and Desist Orders with the Colorado Department of Public Health and Environment (CDPHE) – Water Quality Control Division (WQCD) regarding two Colorado Discharge Permits associated with the Site. Currently, its status on Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is No Further Remedial Action Planned (NFRAP) (as of December 17, 2010). This letter report summarizes the history of this Site and recommends to the U.S. Environmental Protection Agency (U.S. EPA) that no further assessment is needed at this time.

Site Background

The London Mine Site (LMS) is located in the headwaters of South Mosquito Creek, approximately 4 miles west of the Town of Alma in Park County, Colorado, at an elevation ranging from 11,000 feet above mean sea level (msl) to 12,400 feet above msl (refer to Figures 1and 2, included as Attachment 1). Mining and milling operations have been intermittently active at the LMS since 1875. The LMS is divided into three segments: 1) the South Mosquito Creek (SMC), 2) Upper Mosquito Creek (UMC), and 3) Lower Mosquito Creek (LMC) areas.

1) The SMC area encompasses a 2 ½-mile long by ¾-mile wide (1.9 square miles) valley between the London and Pennsylvania mountains. The LMS (London Butte [Water Tunnel] and London Extension Tunnel mines) are in this valley. The SMC drainage, which includes the No Name Creek tributary, runs northeasterly in the alpine valley towards the Mosquito Gulch to join Mosquito Creek (MC). The SMC is listed as an impaired water body under section 303(d) of the Clean Water Act and is designated a 'Use Protected', with the following classifications: 'Aquatic Life Cold 1, Recreation E, Water Supply, and Agriculture'. The sources identified within the SMC area include the London Mine Butte discharge, the London Extension Mine Water

Discharge, the London Extension Mine Dump, the London Mine Historic Mill Tailings, and the Butte Tunnel Mine Rock Dump.

2) The UMC area covers the 3 ½-mile long by ¾-mile wide (2.6 square miles) valley from the headwaters of MC down to the SMC/MC confluence junction between the London and Loveland mountains. The sources identified within the UMC area include the Champaign, the North London Mine Dump, and the North London Mine Mill Tailings.

3) The LMC area is a 4-mile long by 1-mile wide (4 square miles) valley along the Mosquito Gulch starting from the SMC/MC confluence junction and continuing eastward to the Middle Fork South Platte River. The sources identified within the LMC area include the Montgomery-Alma/Betts Mill Tailings, the Orphan Boy Mine Rock Dump, unnamed dumps, and the Hock Hocking Mine Rock dumps.

The most recent mining activities at the LMS were in 1981-91. In 1980, a Mined Land Reclamation Permit M-1980-250 was issued for modern mining and milling operations at the LMS. In 1997, at the request of the London Mine Limited Liability Company (LLC), the Colorado Mined Land Reclamation Board revoked the permit and forfeited the $12,000 reclamation bond. The title to the surface and mineral rights of the mining claims at the LMS was held by Mr. Ben L. Wright. The LMS is now operated by the Estate of Ben Wright (former London Mine Manager) on behalf of London Mine, LLC (the "Estate").

The London Butte Mine Water Tunnel operates under a Colorado Discharge Permit System (CDPS) Permit Number CO-0038334 through the CDPHE-WQCD. The facility consists of a treatment works for an underground mining operation that is no longer in operation. Contributing wastewater sources at the facility include mine water and groundwater conveyed through the London Butte Mine Water Tunnel. The facility treats mine related wastewater from the tunnel portal through a sedimentation pond. The permit authorizes London Mine, LLC to discharge treated wastewater from the facility through the outfall associated with the final sedimentation pond (Outfall 001A) and into South Mosquito Creek. The final sedimentation pond receives water directly from the tunnel portal. Since 2006, the Water Tunnel discharge has consistently exceeded certain effluent limitations outlined in the Permit (i.e., metals (Cadmium and Zinc), pH, total suspended solids). As a result of the exceedances, the Division issued a Notice of Violation/Cease and Desist Order, Number IO-090715-1 to London Mine, LLC on July 15, 2009, with the expectation that London Mine, LLC engage in efforts to ensure compliance with the Permit by no later than March 31, 2010. As of today, the facility is still not in compliance with the Permit. Additionally, the CDPHE-WQCD sent another Notice of Violation/Cease and Desist Order, Number IO-130321-1 to London Mine, LLC on March 21, 2013.

The London Mine Extension Tunnel operates under a CDPS Permit Number CO-0045209 through the CDPHE-WQCD. The mine waste treatment process consists of a collection system inside the mine adit, followed by cement kiln dust addition equipment, and a lined settling pond. Overflow from the settling pond (Outfall 001) discharges to No Name Creek, while the cement kiln dust and metals settle out in the pond. The CDPHE-WQCD issued a Compliance Order on Consent, Number IC-12051401 on May 18, 2012 to London Mine, LLC regarding Prairie Center Metropolitan District No. 9. The Estate replied to this Compliance Order on Consent as follows:

> "The London Mine, LLC and THF Prairie Center Development, LLC (THF/Prairie) are parties to a Stipulation entered into before the Colorado Water Quality Control Commission in 2004. The Stipulation addresses the operation and maintenance of the Extension Tunnel Treatment Plant (the "Facility"). The Stipulation provides that "THF shall provide for continued operation and

maintenance of the Extension Tunnel Treatment Plant to treat water discharged from the London Mine via the Extension Tunnel." Moreover, under Prairie's Permit No. CO-0045209, THF/Prairie's duty extends to the "collection system inside the mine adit," i.e., the Extension Tunnel. It is THF that has the obligation and duty to maintain and operate the Extension Tunnel and the Facility. For more than a year, exceedances under the London Permit have been measured. These exceedances have been troubling to the Estate for many reasons, not least of which is the fact that the water known to be discharged under the London Permit through the Water Tunnel was clean, not requiring treatment under the Stipulation before it is discharged. The Stipulation only required treatment of the water discharged from the Extension Tunnel under the Prairie permit. The London Mine, LLC has been actively looking into what the potential cause of these effluent limitation exceedances may be, including exploring technical resources for assessing the situation. From investigations conducted to date, which include guidance received from technical consultants, the London Mine, LLC understands that the water that should be discharged from the Extension Tunnel to the Facility for treatment is unfortunately being diverted to the London Mine Water Tunnel. The Estate and the London Mine, LLC have been advised that the diversion of the Extension Tunnel water to the Mine Water Tunnel is a result of damage to the Extension Tunnel caused in connection with THF's past operations at the London Mine. Because the Extension Tunnel water is not discharging to the Facility and therefore has not been treated, when it comingles with the Mine Water Tunnel water it results in the Water Tunnel effluent limitations exceedances. We believe this unauthorized discharge and/or unauthorized bypass of the Extension tunnel water into the Mine Water Tunnel is a violation of the Prairie Center Metropolitan District No. 1 Permit."

Ms. Kelly Morgan, an Enforcement Specialist with the Clean Water Compliance & Enforcement Unit of the CDPHE-WQCD, stated that because THF/Prairie previously purchased some of the water rights from London Mine, LLC, THF/Prairie agreed to hold the Colorado Discharge Permit associated with the Extension Tunnel (i.e., CDPS Permit Number CO-0045209) and entered into this stipulation with London Mine, LLC and CDPHE-WQCD, which was executed in 2004. According to Ms. Morgan, in response to the Compliance Order on Consent (Number IC-12051401) issued to London Mine, LLC and THF/Prairie on May 18, 2012, THF/Prairie performed upgrades to their treatment process so that when/if discharge does occur again in the future from the Extension Tunnel, the effluents would not exceed the discharge permit standards. Ms. Morgan also stated that the associated sedimentation pond associated with the Extension Tunnel has been filled in and above ground tanks are now in place to collect any effluent before being treated and discharged to No Name Creek. Because there has been no discharge from the Extension Tunnel in over two years (since August 2011), and because of the upgrades performed since the issue of the Compliance Order, the CDPHE-WQCD closed the Compliance Order in October 2013.

With regard to the Notice of Violation/Cease and Desist Order issued on March 21, 2013 to London Mine, LLC for the London Butte Mine Water Tunnel, this violation/order is still open and London Mine, LLC is still in non-compliance. According to Ms. Morgan, London Mine, LLC is not currently trying to remedy the effluent exceedances. Ms. Morgan stated that the London Mine, LLC still blames the responsibility of these exceedances from the Water Tunnel on THF/Prairie because of the damage in the Extension Tunnel. Per a letter from the General Manager of London Mine, LLC to the CDPHE-WQCD, dated October 31, 2013, London Mine, LLC stated:

"As you know, THF/Prairie Center holds the Extension Tunnel discharge permit while the London Mine, LLC holds the Water Tunnel discharge permit. Within the inner London mine workings there is a water raise that is a conduit between the Extension Tunnel and the Water

Tunnel. The water from the Extension Tunnel (THF) is carried by the water raise and mixes with the water in the Water Tunnel (London Mine LLC). The reason why the water from the Extension Tunnel flows down the water raise into the Water Tunnel is due to cave-ins and severe degradation of the Extension Tunnel. Were it not for the severe degradation of the Extension Tunnel, the water would not flow down the water raise and instead would be treated at the THF water treatment facility. However, the comingled water from the Water Tunnel is then discharged from the Water Tunnel pursuant to the London Mine water permit" (London Mine LLC Letter, 2013).

Please refer to this London Mine, LLC letter (Attachment 2) for further pertinent information. In addition, London Mine, LLC has reportedly told the CDPHE-WQCD that they do not have money to fix the problem and that they are actively trying to sell the property. Ms. Morgan stated that the CDPHE-WQCD has requested financial information from London Mine, LLC to back up their financial claims, but has yet to receive this information from London Mine, LLC. According to Ms. Morgan, the CDPHE-WQCD has scheduled a hearing for liability issues with London Mine, LLC on March 17-19, 2014 in order to find a potential resolution in regard to the Notice of Violation/Cease and Desist Order issue.

Previous CERCLA Investigations

In 1995, the CDPHE conducted a Preliminary Assessment (PA), with a subsequent Site Inspection (SI) conducted in 1996.

Solid Source sample analytical results collected during the previous SI are summarized in the following table (Table 1). The table shows concentrations of 14 out of 23 metals analyzed in the nine solid source samples were significantly higher than those found in the background soils. In addition, eight of these 14 metals in the nine solid source samples were above an EPA SCDM benchmark.

Table 1 - London Mines/Mosquito Creek Basin Solid Source Samples (concentrations in milligrams per kilogram [mg/kg])

Analyte	Average Background	3x Background	Average Source	Highest Source	**SCDM Benchmark**	Location of Highest Source
Antimony	2.55	7.65	10.19	41.50	0.54 (Ref. Dose Screen Conc.)	SO-03 North London Mine Rock Dump (UMC)
Arsenic	7.60	22.80	32.96	177.00	0.41 (Ref. Dose Screen Conc.) 0.0021 (Cancer Risk Screen Conc.)	SO-03 North London Mine Rock Dump (UMC)
Barium	128.05	384.15	376.56	1,630.00	95 (Ref. Dose Screen Conc.)	SO-04 American-Alma Mill Tailing (UMC)
Cadmium	0.91	2.73	18.99	111.00	0.68 (Ref. Dose Screen Conc.)	SO-13 Montgomery-Alma/Betts Mill Tailing (LMC)
Calcium	5,480.50	16,441.50	19,146.07	33,300.00	Analyte Not Listed	SO-14 Orphan Boy Mine Rock/Mill Tailing (LMC)
Cobalt	4.10	12.30	4.24	13.90	No SCDM Benchmark Listed	SO-03 North London Mine Rock Dump (UMC)
Copper	11.60	34.80	298.70	1,050.00	No SCDM Benchmark Listed	SO-03 North London (UMC) Mine Rock

						Dump
Iron	12,025.00	36,075.00	55,662.22	138,000.00	No SCDM Benchmark Listed	SO-03 North London Mine Rock Dump (UMC)
Lead	75.35	226.05	6,403.00	35,300.00	No SCDM Benchmark Listed	SO-13 Montgomery-Alma/Betts Mill Tailing (LMC)
Magnesium	1,782.00	5,346.00	4,754.22	11,700.00	Analyte Not Listed	SO-04 American-Alma Mill Tailing (UMC)
Manganese	364.00	1,092.00	722.34	3,100.00	190 (Ref. Dose Screen Conc.)	SO-07 Butte Tunnel Mine Rock/Mill Tailing (SMC)
Mercury	0.14	0.42	1.24	3.00	1.0 (FDAAL)	SO-14A OppS Orphan Boy Mine Rock/Mill Tailing (LMC)
Silver	0.56	1.68	28.80	99.20	6.8 (Ref. Dose Screen Conc.)	SO-14 Orphan Boy Mine Rock/Mill Tailing (LMC)
Zinc	123.45	370.35	3,014.48	18,000.00	410 (Ref. Dose Scren Conc.)	SO-13 Montgomery-Alma/Betts Mill Tailing (LMC)

Shaded yellow where concentrations meet HRS criteria for an observed release.

Aqueous Source sample analytical results collected during the previous SI are summarized in Table 2 below. The discharge from the London Extension Mine (SO-08) showed significant concentrations of barium, cadmium, calcium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, and zinc, which appear to be directly reflected in the higher concentrations of these same metals downstream on the No Name Creek at SO-10. The analytical data from these samples are almost identical, which indicate that the sedimentation pond may not have any cleansing effect. The London Butte Mine Drainage sample SO-09 contains high concentrations of barium, calcium, copper, magnesium, manganese, nickel, potassium, sodium, and zinc, which may contribute to the increased concentrations of these same metals in South Mosquito Creek at SW-15. The increased concentrations of these metals at SW-15 may also be attributable to the solid sources from the London Mine Historic Mill Tailing (SO-11) and the London Extension Mine rock dump (SO-12).

Table 2 – London Mines/Mosquito Creek Basin Aqueous Source Samples (concentrations in micrograms per liter [µg/L])

Sample Location	**LONDON EXTENTION MINE DRAINAGE**	**LONDON BUTTE MINE DRAINAGE**
Sample I.D.	**SO-08**	**SO-09**
Date of Collection	**1996 SI**	**1996 SI**
Hardness	197.88	203.51
Calcium Total Concentration	69500	34500
Magnesium Total Concentration	5910	28500
Barium Dissolved Concentration	13.8	41.6
Barium Total Concentration	14.4	42.6
Barium MCL	2000	2000
Barium Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc)	2600	2600
Cadmium Dissolved Concentration	111	U

Cadmium Total Concentration	114	U
Cadmium TVS Chronic	0.71	0.72
Cadmium TVS Acute (Trout)	3.09	3.16
Cadmium MCL	5.0	5.0
Cadmium Ground Water/Surface Water Pathway - Drinking Water (Ref Dose Screen Conc.)	18.0	18.0
Cadmium Surface Water Pathway - Environmental (Acute CMC Fresh)	2.0	2.0
Cadmium Surface Water Pathway - Environmental (Chronic CCC Fresh)	0.25	0.25
Copper Dissolved Concentration	76.6	3
Copper Total Concentration	759	3.6
Copper TVS Chronic	16.05	16.44
Copper TVS Acute	25.57	26.25
Copper MCL	1300	1300
Copper Surface Water Pathway - Environmental (Acute CMC Fresh)	13	13
Copper Surface Water Pathway - Environmental (Chronic CCC Fresh)	9	9
Iron Dissolved Concentration	1060	U
Iron Total Concentration	34700	U
Iron Chronic (Total Recoverable)	1000	1000
Iron Surface Water Pathway - Environmental (Chronic CCC Fresh)	1000	1000
Manganese Dissolved Concentration	1730	32
Manganese Total Concentration	1800	33.8
Manganese TVS Chronic	2070.65	2090.09
Manganese TVS Acute	3747.78	3782.97
Manganese Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	5.1	5.1
Nickel Dissolved Concentration	68.7	3.4
Nickel Total Concentration	68.5	U
Nickel TVS Chronic	92.64	94.87
Nickel TVS Acute	834.10	854.14
Nickel Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	730	730
Nickel Surface Water Pathway - Environmental (Acute CMC Fresh)	470	470
Nickel Surface Water Pathway - Environmental (Chronic CCC Fresh)	52	52
Zinc Dissolved Concentration	25500	556
Zinc Total Concentration	26300	553
Zinc Chronic (Total Recoverable)	220	220
Zinc Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	11000	11000
Zinc Surface Water Pathway - Environmental (Acute CMC Fresh)	120	120
Zinc Surface Water Pathway - Environmental (Chronic CCC Fresh)	120	120

Table Value Standard (TVS) based on dissolved concentrations. Shaded yellow where concentrations meet HRS criteria for an observed release. U = not detected.

Aqueous Surface Water sample analytical results collected during the previous SI are summarized in Table 3 below. Analytical results indicated that elevated metals concentrations in the Mosquito Creek Basin included cadmium, copper, manganese, selenium, and zinc. Surface water samples in the main stream Upper Mosquito Creek (i.e., Main stream samples SW-01, 03, 07, and 08; Tributary samples SW-02, 04, and 06) generally exhibited lower analyte concentrations than those found in the South Mosquito (i.e., Main stream samples SW-09, 10, 14, and 15; Tributary samples SW-12 and 13) and Lower Mosquito creeks (i.e., Main stream samples SW-17, 18, and 19; Tributary samples SW-34 OppS).
A summary of the surface water analytical results by stream segment are as follows:

- Upper Mosquito Creek: Elevated total and dissolved zinc concentrations were exhibited downstream from the main stream Upper Mosquito Creek wetland and fishery areas.
- South Mosquito Creek: Total and dissolved metals concentrations were generally higher than those found in Upper Mosquito Creek. The most downstream aqueous sample taken from the main South Mosquito Creek showed the highest total metals concentration for copper (6.70 µg/L), lead (45.20 µg/L), and manganese (40.00 µg/L). High dissolved and total metals concentrations were found in the London Extension Mine drainage sample for barium, cadmium, calcium, copper, iron, magnesium, manganese, nickel, sodium, and zinc. Total zinc concentrations in aqueous samples ranged from 20.10 µg/L to 332 µg/L, with the highest total zinc concentration of 562 µg/L detected in a sample collected downstream of the mine on No Name Creek tributary. In addition, the total cadmium concentration in this sample was 1.80 µg/L. Sediment samples generally exhibited lower analyte concentrations than in the Upper Mosquito creek except for cadmium and zinc.
- Lower Mosquito Creek: Though at lower concentrations, the same analytes found with elevated concentrations in the South Mosquito Creek were reflected in the main stream of the Lower Mosquito Creek.
- Middle Fork South Platte River: None of the release aqueous samples from the Middle Fork South Platte River exhibited high dissolved metal concentrations except for copper, which was elevated in the Middle Fork South Platte River wetland and fishery below the Sacramento Creek. Although below AWQC standards, zinc total metals concentrations were also elevated starting in the wetlands below the Pennsylvania Creek and down below the Sacramento Creek. For total metals in the sediment samples, elevated concentrations were indicated for arsenic, silver, and sodium.

Table 3 – London Mines/Mosquito Creek Basin Aqueous Surface Water Samples (concentrations in micrograms per liter [µg/L])

Analyte & TVS/SCDM Benchmarks	Average Background	Average Value Elevated Release Sample	# Elevated Release Samples	Highest Release Value	Location Highest Release Sampl
Hardness	17.68	84.84	---	---	---
Calcium Total Concentration	2653.33	21000	2/19	27500.00	SW-34 OppS Orphan Boy/Cooper Creek
Magnesium Total Concentration	2683.33	7868.33	6/19	13600.00	SW-34 OppS Orphan Boy/Cooper Creek

Cadmium Dissolved Concentration	1.00	1.90	1/19	1.90	SW-13 No Name Creek
Cadmium Total Concentration	1.00	1.53	3/19	1.80	SW-13 No Name Creek
Cadmium TVS Chronic	0.11	0.37	---	0.37	---
Cadmium TVS Acute (Trout)	0.38	1.48	---	1.48	---
Cadmium MCL	5.0	5.0	---	5.0	---
Cadmium Ground Water/Surface Water Pathway - Drinking Water (Ref Dose Screen Conc.)	18.0	18.0	---	18.0	---
Cadmium Surface Water Pathway - Environmental (Acute CMC Fresh)	2.0	2.0	---	2.0	---
Cadmium Surface Water Pathway - Environmental (Chronic CCC Fresh)	0.25	0.25	---	0.25	---
Copper Dissolved Concentration	1.00	4.57	6/19	19.20	SW-34 OppS Orphan Boy/Cooper Creek
Copper Total Concentration	1.00	2.91	8/19	6.70	SW-15 London Historic Mill Tail
Copper TVS Chronic	2.04	7.78	---	7.78	---
Copper TVS Acute	2.63	11.51	---	11.51	---
Copper MCL	1300	1300	---	1300	---
Copper Surface Water Pathway - Environmental (Acute CMC Fresh)	13	13	---	13	---
Copper Surface Water Pathway - Environmental (Chronic CCC Fresh)	9	9	---	9	---
Iron Dissolved Concentration	61.67	517.00	1/19	517.00	SW-34 OppS Orphan Boy/Cooper Creek
Iron Total Concentration	38.57	252.00	2/19	274.00	SW-15 Below London Historic Mill Tailings
Iron Chronic (Total Recoverable)	1000	1000	---	1000	---
Iron Surface Water Pathway - Environmental (Chronic CCC Fresh)	1000	1000	---	1000	---
Manganese Dissolved Concentration	4.96	32.16	7/19	110.00	SW-34 OppS Orphan Boy/Cooper Creek
Manganese Total Concentration	8.33	23.76	8/19	40.00	SW-15 Below London Historic Mill Tailings
Manganese TVS Chronic	926.13	1561.68	---	1561.68	---
Manganese TVS Acute	1676.26	2826.56	---	2826.56	---
Manganese Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	5.1	5.1	---	5.1	---

Selenium Dissolved Concentration	5.00	NA	---	---	SW-15 Below London Historic Mill Tailings
Selenium Total Concentration	5.00	5.60	2/19	5.70	SW-02 Tributary from Oliver Twist Mine
Selenium TVS Chronic	4.6	4.6	---	4.6	---
Selenium TVS Acute	18.4	18.4	---	18.4	---
Selenium MCL	50	50	---	50	---
Seleniium Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	180	180	---	180	---
Selenium Surface Water Pathway - Environmental (Chronic CCC Fresh)	5.0	5.0	---	5.0	---
Zinc Dissolved Concentration	11.07	208.23	14/19	1180.00	SW-34 OppS Orphan Boy/Cooper Creek
Zinc Total Concentration	10.37	183.12	12/19	562.00	SW-13 No Name Creek
Zinc Chronic (Total Recoverable)	220	220	---	220	---
Zinc Ground Water/Surface Water Pathway - Drinking Water (Ref. Dose Screen Conc.)	11000	11000	---	11000	---
Zinc Surface Water Pathway - Environmental (Acute CMC Fresh)	120	120	---	120	---
Zinc Surface Water Pathway - Environmental (Chronic CCC Fresh)	120	120	---	120	---

Table Value Standard (TVS) based on dissolved concentrations. Shaded yellow where concentrations meet HRS criteria for an observed release.

Based on CDPHE's SI, EPA determined in 1998 that the area was a high priority for further assessment based on:

- Source Areas totaling 23 acres of tailings, 250,000 cubic yards of mine related sources and draining adits;
- Releases of multiple metals to wetlands and a fishery above SCDM benchmarks;
- A segment of fishery gone due to contamination;
- The potential presence of threatened and endangered species; and
- Elevated concentrations of several metals that were found in ground water used for drinking water, when compared to available background.

In 2010, EPA determined that no further remedial action was warranted at the Site due to "significant water treatment work being performed by other parties, including the owners and State of Colorado Division of Reclamation Mining and Safety." Thus, the Site was given a no further remedial action planned (NFRAP) determination and was archived from the CERCLIS database. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

Refer to Attachment 3 summarizing records/file reviews conducted as part of this Letter Report from the CDPHE – Hazardous Materials and Waste Management Division, the CDPHE-WQCD, and the Colorado Division of Reclamation, Mining and Safety (DRMS).

Current Activities/Data

DRMS conducted tailings reclamation at the LMS in the summer of 2013 due to South Mosquito Creek failing to meet applicable standards for zinc, iron, manganese, and cadmium. Based on a project summary provided by the DRMS, the LMS contains three mill tailings piles and a number of waste rock piles that are immediately adjacent to South Mosquito Creek. In the spring, the creek significantly erodes the tailings piles which leach acidic, metal-laden water and sediment into the creek. When the mining permit was revoked in 1997, at the request of London Mine, LLC, they forfeited the $12,000 reclamation bond which was used by DRMS to partially stabilize portions of the tailings, but were significantly insufficient to complete reclamation of the overall site to applicable performance standards. Based on information received from DRMS in March 2013, DRMS planned to implement the tailings reclamation project as follows:

> "The London tailings reclamation can most efficiently be completed over two construction seasons, in 2013 and 2014. Site investigations indicate that tailings fill the natural bed of South Mosquito Creek, and that the creek has been relocated to route along the north edge of the tailings. The preferred reclamation alternative for the London tailings 2013 project area includes removal of tailings adjacent to the relocated creek down to creek level and consolidation into the impoundment constructed in the 1980s (known as the "Elephant Trap"). The consolidated tailings will then be banked against the north flank of Pennsylvania Mountain to maximize separation of the tailings from the relocated creek. Structural fill imported to the project area from permitted gravel sources at or near Alma or Fairplay will be placed over tailings as capping material and to maintain the relocated creek in its current configuration, and plant growth medium will be applied over the cap. A mix of wetland, riparian, and upland vegetation zones will be established in the excavated area and over the consolidated and capped tailings."

Based on more recent discussions with DRMS in December 2013, DRMS stated the following regarding the 2013 work season:

> "[DRMS] started the project this summer [2013] and McCollum's Excavating was the selected contractor to do the work. The project work involved removing tailings material adjacent to South Mosquito Creek down to creek level, consolidating the tailings into the impoundment (referred to as the "Elephant Trap"), excavated cover material from designated borrow locations and placement of cover materials over the reclaimed area. [DRMS] hauled in some biosolids and plant growth medium to be incorporated into the soil. Because of the winter weather conditions, incorporating the biosolids/plant growth medium and revegetation will occur in the spring of 2014. In addition, [DRMS] [has] a separate project that will include wetland restoration along South Mosquito Creek and the reconstructed drainage channels in 2014. [DRMS] also did a bit of tailings removal in the London Butte area that was impacted by a large landslide two years ago. The remaining work on the Butte Tailings area will take place in 2014. We will develop a reclamation plan this winter and put it out for bid next spring."

DRMS does not have any sampling data to share at this time. Refer to Attachment 4 for DRMS's initial project summary packet.

The self-monitoring effluent data collected by London Mine, LLC from May 2009 to January 2013, regarding CDPS Permit Number CO-0038334 (Water Tunnel), exceed the effluent limitations imposed by Part I.A.1 of the Permit as follows:

- Total Suspended Solids: Max 7 Day Average Limit = 20 mg/L (***Result = <50***)
  30 Day Average Limit = 20 mg/L (***Result = <50***)
- pH: Minimum Limit = 6.5 S.U. (***Result = 6.23 and 6.4***)
- Zinc (potentially dissolved): Max 7 Day Average Limit = 1,300 µg/L
  (***Result = 1,400 to 4,910***)
  85th Percentile of 24 Month Rolling Average Limit = 654 µg/L
  (***Result = 1,377.5 to 2,967***)
- Cadmium (potentially dissolved): 30 Day Average Limit = 3.2 µg/L (***Result = 3.8 to 14.9***)

Ms. Morgan of the CDPHE-WQCD provided the following recent surface water monitoring data from South Mosquito Creek, which was conducted by Golder Associates, Inc.:

Date Sampled	Analyte (Dissolved Metal)	Result (µg/L)	State Table Value Standard (µg/L)
10/18/2012	Cadmium	***3.0***	0.74
	Zinc	***820***	280
11/14/2012	Cadmium	***2.3***	0.72
	Zinc	***600***	280
12/14/2012	Cadmium	***3.1***	0.74
	Zinc	***730***	280
01/09/2013	Cadmium	***2.5***	0.77
	Zinc	***870***	280
02/12/2013	Cadmium	***2.3***	0.77
	Zinc	***740***	280
04/25/2013	Cadmium	***3.2***	0.82
	Zinc	***740***	280
05/22/2013	Cadmium	***1.4***	0.49
	Zinc	***360***	280
06/05/2013	Cadmium	ND	0.31
	Zinc	***160***	280
07/10/2013	Cadmium	***1.4***	0.42
	Zinc	***320***	280

08/13/2013	Cadmium	***2.6***	0.66
	Zinc	***540***	280
09/11/2013	Cadmium	***2.1***	0.60
	Zinc	***490***	280

Conclusion and Recommendation

The LMS, owned by London Mine, LLC, was the subject of a Preliminary Assessment (1995) and Site Inspection (1996). Two CDPS Permits are associated with the LMS, including CDPS Permit Number CO-0038334 (London Mine Water Tunnel) and the CDPE Permit Number CO-0045209 (London Mine Extension Tunnel). A wastewater treatment facility has historically treated mine-related water discharging from the Extension Tunnel prior to discharging to No Name Creek and subsequently South Mosquito Creek, while water discharging from the Water Tunnel has historically been considered "clean". Since 2009 to the present, and due to damage in the Extension Tunnel from what London Mine, LLC claims happened from THF/Prairie's actions, water that would otherwise discharge from the Extension Tunnel has re-routed itself through the Water Tunnel discharge resulting in effluent exceedances in the Water Tunnel CDPS Permit. For approximately the last two years, effluent discharge has not occurred through the Extension Tunnel. The CDPHE-WQCD issued a Compliance Order on Consent to London Mine, LLC on June 18, 2012 regarding the CDPS Permit noncompliance with the Extension Tunnel. However, the CDPHE-WQCD closed this Compliance Order in October 2013 due to THF/Prairie performing upgrades to their treatment process so that when/if discharge occurs again in the future from the Extension Tunnel, the effluents would not exceed the discharge permit standards.

In addition, the CDPHE-WQCD issued a Notice of Violation/Cease and Desist Order to London Mine, LLC on March 21, 2013 regarding the CDPS Permit noncompliance with the Water Tunnel, which still currently stands. London Mine, LLC reportedly stated to the CDPHE-WQCD that they do not have the current funds to fix the problem and that they are actively trying to sell the property, in which the new property owner would be liable for fixing the effluent exceedances. The CDPHE-WQCD has scheduled a hearing for liability issues with London Mine, LLC on March 17-19, 2014 in order to find a potential resolution in regard to the Notice of Violation/Cease and Desist Order issue.

DRMS recently completed tailings reclamation work adjacent to South Mosquito Creek this past summer (2013) and consolidated the tailings into the previously constructed (i.e., 1980s) impoundment referred to as the "Elephant Trap", which is banked against the north flank of Pennsylvania Mountain. At the same time, DRMS also completed a bit of tailings removal in the London Butte area that was impacted by a large landslide two years ago. DRMS plans to complete the removal activities in the Butte Tailings area in 2014. In addition, DRMS plans to include wetland restoration along South Mosquito Creek and the reconstructed drainage channels in 2014.

Based on recent surface water data collected from South Mosquito Creek by Golder Associates, Inc. at the end of 2012 and to September 2013, concentrations of zinc and cadmium, while above State Table Value Standards for this stream segment, were similar or slightly higher than samples collected during the previous SI investigation. However, during the previous SI, none of the surface water samples collected from the Middle Fork South Platte River (further downstream and considered a fishery)

exhibited high dissolved metal concentrations attributable to the LMS, which is still most likely the case based on this recently collected data.

Based on the continued tailings reclamation activities by DRMS in the spring and summer of 2014, and the current CDPHE-WQCD enforcement action activities with regard to the CDPS Permit associated with the Water Tunnel (i.e., scheduled court hearing on March 17-19, 2014), the CDPHE recommends that the CERCLIS designation of "No Further Remedial Action Planned" is applicable for the LMS, *at this time*, based on Other Cleanup Activity (OCA) occurring and that the Site should be maintained as archived. However, the CDPHE recommends obtaining the results/outcome of these future planned activities for the Site in order to identify the outcome of the upcoming court hearing and to confirm that current OCA efforts are successful before verifying if further Superfund consideration is warranted.

Please contact me at 303-692-3324 or alissa.schultz@state.co.us if you have any questions.

Sincerely,

Alissa Schultz
Environmental Protection Specialist
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

Attachments
1: Figure 1 and 2
2: London Mine, LLC Letter (October 2013)
3: Summary of Records/File Review
4: DRMS Project Summary

References

CDPHE (HWWMD), July 22, 1995, *Preliminary Assessment – London Mines/Mosquito Creek Basin – Park County, Colorado*.

CDPHE (HMWMD), April 24, 1998, *Site Inspection – Analytical Results Report – London Mines/Mosquito Creek Basin (CERCLIS ID CO0000286203)*.

CDPHE (WQCD), various documents, correspondence, and data regarding CDPS Permits, and personnel communication with Ms. Kelly Morgan of the WQCD (see Attachments 2 and 3)

DRMS, London Mill Tailings Reclamation Project Summary Packet and personnel communication with Ms. Erica Crosby of DRMS (see Attachment 4).

ATTACHMENT 1

FIGURES

ATTACHMENT 2

LONDON MINE, LLC LETTER
(OCTOBER 2013)

ATTACHMENT 3

SUMMARY OF RECORDS/FILE REVIEW

ATTACHMENT 4

DRMS PROJECT SUMMARY